Oecologia

In Cooperation with the
International Association for Ecology (Intecol)

Vol. 51 1981

Editorial Board

L. C. Birch, Sydney
P. J. den Boer, Wijster (Dr.)
P. R. Ehrlich, Stanford
J. T. Enright, La Jolla
M. Evenari, Jerusalem
D. M. Gates, Ann Arbor
C. J. Krebs, Vancouver
O. L. Lange, Würzburg
H. Larcher, Innsbruck
D. Neumann, Köln
B. Osmond, Canberra City
J. Phillipson, Oxford
H. Remmert, Marburg/Lahn
J. Roughgarden, Stanford
F. Schaller, Wien
B. R. Strain, Durham
E.-D. Schulze, Bayreuth
W. Wieser, Innsbruck
H. Ziegler, München
H. Zwölfer, Bayreuth

Editor in Chief: H. Remmert

Springer International

The exclusive copyright for all languages and countries, including the right for photomechanical and any other reproductions, also in microform, is transferred to the publisher.

The use of registered names, trademarks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

Authors of this journal can benefit from library and photocopy fees collected by WORT if certain conditions are met. If an author lives in the Federal Republic of Germany or in West Berlin it is recommended that he contacts Verwertungsgesellschaft WORT, Abteilung Wissenschaft, Goethestrasse 49, D-8000 München 2, for detailed information.

Die in der Zeitschrift veröffentlichten Beiträge sind urheberrechtlich geschützt. Alle Rechte, insbesondere das der Übersetzung in fremde Sprachen, vorbehalten. Kein Teil dieser Zeitschrift darf ohne schriftliche Genehmigung des Verlages in irgendeiner Form – durch Fotokopie, Mikrofilm oder andere Verfahren – reproduziert oder in eine von Maschinen, insbesondere von Datenverarbeitungsanlagen, verwendbare Sprache übertragen werden.

Auch die Rechte der Wiedergabe durch Vortrag, Funk- und Fernsehsendung, im Magnettonverfahren oder ähnlichem Wege bleiben vorbehalten.

Fotokopien für den persönlichen und sonstigen eigenen Gebrauch dürfen nur von einzelnen Beiträgen oder Teilen daraus als Einzelkopien hergestellt werden. Jede im Bereich eines gewerblichen Unternehmens hergestellte oder benützte Kopie dient gewerblichen Zwecken gem. § 54 (2) UrhG und verpflichtet zur Gebührenzahlung an die VG WORT, Abteilung Wissenschaft, Goethestraße 49, D-8000 München 2, von der die einzelnen Zahlungsmodalitäten zu erfragen sind.

Autoren dieser Zeitschrift können unter gewissen Voraussetzungen in die Individualausschüttung von Mitteln aus der Bibliothektantieme und dem Fotokopieraufkommen mit einbezogen werden. Genaue Informationen erteilt die Verwertungsgesellschaft WORT, Abteilung Wissenschaft, Goethestr. 49, D-8000 München 2.

Die Wiedergabe von Gebrauchsnamen, Handelsnamen, Warenbezeichnungen usw. in dieser Zeitschrift berechtigt auch ohne besondere Kennzeichnung nicht zu der Annahme, daß solche Namen im Sinne der Warenzeichen- und Markenschutz-Gesetzgebung als frei zu betrachten wären und daher von jedermann benutzt werden dürften.

Springer-Verlag Berlin Heidelberg New York

Printed in Germany by Universitätsdruckerei H. Stürtz AG, Würzburg

© by Springer-Verlag Berlin Heidelberg 1981

Contents

Abrams, P.: Alternative Methods of Measuring Competition Applied to Two Australian Hermit Crabs 233
Abrams, P.: Competition in an Indo-Pacific Hermit Crab Community 240
Abrams, P.: Shell Fighting and Competition Between Two Hermit Crab Species in Panama 84
Adams, E.S., Traniello, J.F.A.: Chemical Interference Competition by *Monomorium minimum* (Hymenoptera: Formicidae) . 265
Andrews, R.H., Petney, T.N.: Competition for Sites of Attachment to Hosts in Three Parapatric Species of Reptile Tick . 227
Anthony, E.L.P., Stack, M.H., Kunz, T.H.: Night Roosting and the Nocturnal Time Budget of the Little Brown Bat *Myotis lucifugus*: Effects of Reproductive Status, Prey Density and Environmental Conditions 151
Barbault, R., Maury, M.-E.: Ecological Organization of a Chihuahuan Desert Lizard Community 335
Batanouny, K.H., Ebeid, M.M.: Diurnal Changes in Proline Content of Desert Plants 250
Bennack, D.E.: The Effects of Mandible Morphology and Photosynthetic Pathway on Selective Herbivory in Grasshoppers . 281
Boynton, W.R., s. Kemp, W.M. 19
Brock, M.A.: Accumulation of Proline in a Submerged Aquatic Halophyte, *Ruppia* L. 217
Buxton, R.D.: Changes in the Composition and Activities of Termite Communities in Relation to Changing Rainfall . . 371
Buxton, R.D.: Termites and the Turnover of Dead Wood in an Arid Tropical Environment 379
Clay, K., Shaw, R.: An Experimental Demonstration of Density-Dependent Reproduction in a Natural Population of *Diamorpha smallii*, a Rare Annual 1
Collins, N.M.: The Role of Termites in the Decomposition of Wood and Leaf Litter in the Southern Guinea Savanna of Nigeria 389
Corbet, S.A., Cuthill, I., Fallows, M., Harrison, T., Hartley, G.: Why do Nectar-Foraging Bees and Wasps Work Upwards on Inflorescences? 79
Corbet, S.A., Willmer, P.G.: The Nectar of *Justicia* and *Columnea*: Composition and Concentration in a Humid Tropical Climate 412
Corbet, S.A., s. Willmer, P.G. 67
Courtney, S.P.:Coevolution of Pierid Butterflies and their Cruciferous Foodplants. III. *Anthocharis cardamines* (L.) Survival, Development and Oviposition on Different Hostplants . . 91
Crossley, D.A., Jr., s. Swank, W.T., et al. 297
Cunningham, G.L., s. Reynolds, J.F. 357
Cuthill, I., s. Corbet, S.A., et al. 79
Davies, W.J., s. Osonubi, O. 343
Day, R.W., Osman, R.W.: Predation by *Patiria miniata* (Asteroidea) on Bryozoans: Prey Diversity May Depend on the Mechanism of Succession 300
Dial, B.E., Fitzpatrick, L.C.: The Energetic Costs of Tail Autonomy to Reproduction in the Lizard *Coleonyx brevis* (Sauria: Gekkonidae) 310
Detling, J.K., s. Hilbert, D.W., et al. 14
Dyer, M.I., s. Hilbert, D.W., et al. 14
Ebeid, M.M., s. Batanouny, K.H. 250
Ellner, S., Shmida, A.: Why are Adaptations for Long-Range Seed Dispersal Rare in Desert Plants? 133
Ernsting, G., Mulder, A.J.: Components of Predatory Behaviour Underlying Density-Dependent Prey-Size Selection by *Notiophilus biguttatus* F. (Carabidae, Coleoptera) 169
Ewers, F.W., Schmid, R.: Longevity of Needle Fascicles of *Pinus longaeva* (Bristlecone Pine) and Other North American Pines 107
Fallows, M., s. Corbet, S.A., et al. 79
Fichter, B.L., Stephen, W.P.: Time Related Decay in Prey Antigens Ingested by the Predator *Podisus maculiventris* (Hemiptera, Pentatomidae) as Detected by ELISA 404
Fitzpatrick. L.C., s. Dial, B.E. 310
Fleming, T.H.: Fecundity, Fruiting Pattern, and Seed Dispersal in *Piper amalago* (Piperaceae), a Bat-Dispersed Tropical Shrub 42
Friedman, J., Stein, Z., Rushkin, E.: Drought Tolerance of Germinating Seeds and Young Seedlings of *Anastatica hierochuntica* L. 400
Gadoon, M.A., s. Hussain, F. 284
Gibson, J.B., May, T.W., Wilks, A.V.: Genetic Variation at the Alcohol Dehydrogenase Locus in *Drosophila melanogaster* in Relation to Environmental Variation: Ethanol Levels in Breeding Sites and Allozyme Frequencies 191
Gilbert, B.S., Krebs, C.J.: Effects of Extra Food on *Peromyscus* and *Clethrionomys* Populations in the Southern Yukon . . 326
Gleeson, S.K.: Character Displacement in Flowering Phenologies (Short Communication) 294
Gutterman, Y., Herr, N.: Influences of Porcupine *(Hystrix-indica)* Activity on the Slopes of the Northern Negev Mountains – Germination and Vegetation Renewal in Different Geomorphological Types and Slope Directions 332
Halpin, Z.T.: Adult-Young Interactions in Island and Mainland Populations of the Deermouse *Peromyscus maniculatus* . . 419
Harrison, T., s. Corbet, S.A., et al. 79
Hartley, G., s. Corbet, S.A., et al. 79
Hebert, P.D.N., s. Loaring, J.M. 162
Herr, N., s. Gutterman, Y. 332
Hilbert, D.W., Swift, D.M., Detling, J.K., Dyer, M.I.: Relative Growth Rates and the Grazing Optimization Hypothesis . 14
Horvitz, C.C.: Analysis of How Ant Behaviors Affect Germination in a Tropical Myrmecochore *Calathea microcephala* (P. & E.) Koernicke (Marantaceae): Microsite Selection and Aril Removal by Neotropical Ants, *Odontomachus, Pachycondyla,* and *Solenopsis* (Formicidae) 47
Hussain, F., Gadoon, M.A.: Allelopathic Effects of *Sorghum vulgare* Pers. 284
Karasov, W.H.: Daily Energy Expenditure and the Cost of Activity in a Free-Living Mammal 253
Karban, R.: Effects of Local Density on Fecundity and Mating Speed for Periodical Cicadas 260
Kemp, W.M., Boynton, W.R.: External and Internal Factors Regulating Metabolic Rates of an Estuarine Benthic Community 19
King, D.: Tree Dimensions: Maximizing the Rate of Height Growth in Dense Stands 351
Kozlowski, T.T., s. Norby, R.J. 33
Krebs, C.J., s. Gilbert, B.S. 326
Kunz, T.H., s. Anthony, E.L.P., et al. 151
Lange, O.L., Tenhunen, J.D.: Moisture Content and CO_2 Exchange of Lichens, II. Depression of Net Photosynthesis in *Ramalina maciformis* at High Water Content is Caused by Increased Thallus Carbon Dioxide Diffusion Resistance (Short Communication) 426
Leeuwen, B.H. van: The Role of Pollination in the Population Biology of the Monocarpic Species *Cirsium palustre* and *Cirsium vulgare* 28
Livshits, G.M.: Survival, Behaviour and Spatial Distribution of Shell Morphs in a Population of the Snail *Brephulopsis bidens* (*Pulmonata*) 220
Loaring, J.M., Hebert, P.D.N.: Ecological Differences Among Clones of *Daphnia pulex* Leydig 162
Marion, K.R., s. O.J. Sexton 37
Maury, M.-E., s. Barbault, R. 335
May, T.W., s. J.B. Gibson et al. 191
Mac Nally, R.C.: On the Reproductive Energetics of Chorusing Males: Energy Depletion Profiles, Restoration and Growth in Two Sympatric Species of *Ranidella* (Anura) 181
McCauley, D.E., Ott, J.R., Stine, A., McGrath, S.: Limited Dis-

persal and its Effect on Population Structure in the Milkweed Beetle *Tetraopes tetraophthalmus* . . . 145
McGovern, M., Tracy, C.R.: Phenotypic Variation in Electromorphs Previously Considered to be Genetic Markers in *Microtus ochrogaster* . . . 276
McGrath, S., s. McCauley, D.E., et al. . . . 145
McMaster, G.S., Zedler, P.H.: Delayed Seed Dispersal in *Pinus torreyana* (Torrey Pine) . . . 62
Mills, N.J.: The Estimation of Mean Duration from Stage Frequency Data . . . 206
Mills, N.J.: The Estimation of Recruitment from Stage Frequency Data . . . 212
Monro, J., s. Myers, J.H., et al. . . . 7
Montenegro, G., s. Simonetti, J.A. . . . 189
Montgomery, W.I.: A Removal Experiment with Sympatric Populations of *Apodemus sylvaticus* (L.) and *A. flavicollis* (Melchior) (Rodentia: Muidae) . . . 123
Mulder, A.J., s. Ernsting, G. . . . 169
Murray, N., s. Myers, J.H., et al. . . . 7
Myers, J.H., Monro, J., Murray, N.: Egg Clumping, Host Plant Selection and Population Regulation in *Cactoblastis cactorum* (Lepidoptera) . . . 7
Neuvonen, S., Niemelä, P.: Species Richness of Macrolepidoptera on Finnish Deciduous Trees and Shrubs . . . 364
Niemelä, P., s. Neuvonen, S. . . . 364
Norby, R.J., Kozlowski, T.T.: Relative Sensitivity of Three Species of Woody Plants to SO_2 at High or Low Exposure Temperature . . . 33
Osman, R.W., s. Day, R.W. . . . 300
Osonubi, O., Davies, W.J.: Root Growth and Water Relations of Oak and Birch Seedlings . . . 343
Ott, J.R., s. McCauley, D.E., et al. . . . 145
Petney, T.N., s. Andrews, R.H. . . . 227
Reader, P.M., Southwood, T.R.E.: The Relationship Between Palatability to Invertebrates and the Successional Status of a Plant . . . 271
Reynolds, J.F., Cunningham, G.L.: Validation of a Primary Production Model of the Desert Shrub *Larrea tridentata* Using Soil-Moisture Augmentation Experiments . . . 357
Rushkin, E., s. Friedman, J., et al. . . . 400
Schmid, R., s. Ewers, F.W. . . . 107
Scriber, J.M.: Sequential Diets, Metabolic Costs, and Growth of *Spodoptera eridania* (Lepidoptera: Noctuidae) Feeding upon Dill, Lima Bean, and Cabbage . . . 175
Sexton, O.J., Marion, K.R.: Experimental Analysis of Movements by Prairie Rattlesnakes, *Crotalus viridis*, During Hibernation . . . 37
Shaw, R., s. Clay, K. . . . 1
Shiff, C.J., s. Stave, M.E. . . . 408
Shmida, A., s. Ellner, S. . . . 133
Shreeve, T.G.: Flight Patterns of Butterfly Species in Woodlands 289
Simonetti, J.A., Montenegro, G.: Food Preferences by *Octodon degus* Rodentia Caviomorpha: Their Role in the Chilean Matorral Composition . . . 189
Southwood, T.R.E., s. Reader, P.M. . . . 271
Stack, M.H., s. Anthony, E.L.P., et al. . . . 151
Statzner, B.: A Method to Estimate the Population Size of Benthic Macroinvertebrates in Streams . . . 157
Stave, M.E., Shiff, C.J.: Temporal Segregation in North American Desert Membracidae . . . 408
Stein, Z., s. Friedman, J., et al. . . . 400
Stephen, W.P., s. Fichter, B.L. . . . 404
Stine, A., s. McCauley, D.E., et al. . . . 145
Swank, W.T., Waide, J.B., Crossley, D.A., Jr., Todd, R.L.: Insect Defoliation Enhances Nitrate Export from Forest Ecosystems 297
Swift, D.M., s. Hilbert, D.W., et al. . . . 14
Szarek, S.R., s. Wallace, C.S. . . . 57
Tempel, A.S.: Field Studies of the Relationship Between Herbivore Damage and Tannin Concentration in Bracken (*Pteridium aquilinum* Kuhn) . . . 97
Tenhunen, J.D., s. Lange, O.L. . . . 426
Todd, R.L., s. Swank, W.T., et al. . . . 297
Tracy, C.R., s. McGovern, M. . . . 276
Traniello, J.F.A., s. Adams, E.S. . . . 265
Vahl, O.: Age-Specific Residual Reproductive Value and Reproductive Effort in the Iceland Scallop, *Chlamys islandica* (O.F. Müller) . . . 53
Vleck, C.M.: Hummingbird Incubation: Female Attentiveness and Egg Temperature . . . 199
Waide, J.B., s. Swank, W.T., et al. . . . 297
Wallace, C.S., Szarek, S.R.: Ecophysiological Studies of Sonoran Desert Plants. VII. Photosynthetic Gas Exchange of Winter Ephemerals from Sun and Shade Environments . . . 57
Waller, D.M.: Neighborhood Competition in Several Violet Populations . . . 116
Warwick, R.M.: The Influence of Temperature and Salinity on Energy Partitioning in the Marine Nematode *Diplolaimelloides bruciei* . . . 318
Westman, W.E.: Seasonal Dimorphism of Foliage in Californian Coastal Sage Scrub . . . 385
Wilks, A.V., s. Gibson, J.B., et al. . . . 191
Willmer, P.G., Corbet, S.A.: Temporal and Microclimatic Partitioning of the Floral Resources of *Justicia aurea* Amongst a Concourse of Pollen Vectors and Nectar Robbers . . . 67
Willmer, P.G., Corbet, S.A. . . . 412
Zedler, P.H., s. McMaster, G.S. . . . 62
Erratum . . . 429

Indexed in Current Contents